USER MANUAL

Longo programmable controller
LPC-2.EO1 EnOcean module

Version 3

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User Manual

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STANDARDS AND PROVISIONS: Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 230 VAC network is allowed for authorized personnel only.
DANGER WARNINGS: Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation.
WARRANTY CONDITIONS: For all modules LONGO LPC-2 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of maximum allowed connecting power, we offer warranty for 24 months from date of sale to end buyer. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.
This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.
Hazardous voltage in the device can cause electric shock and may result in personal injury or death.
NEVER SERVICE THIS PRODUCT YOURSELF!
This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).
If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.

Waste electrical and electronic equipment (WEEE) must be collected separately!

LONGO LPC-2 complies to the following standards:
- EMC:EN 61000-6-2 (EN 50082), EN 61000-6-4 (EN 50081)
- LVD: IEC 61131-2
- Vibrations and climatic-mechanical: EN 60068-2-6, EN 60068-2-27, EN 60068-2-29

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

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1 DESCRIPTION

LPC-2.EO1 is an EnOcean wireless transceiver module used for wireless communication with EnOcean (http://www.enocean.com) miniaturized energy harvesting modules.

LPC-2.EO1 module is based on EnOcean TCM320 transceiver module with integrated whip antenna (please refer to "User Manual TCM3xy Vx.xx.pdf" for detail information).

LPC-2.EO1 module can support up to 5 input EnOcean devices like rocker switches, occupancy sensors, temperature sensors etc. and up to 5 output EnOcean devices like switching receivers, light dimmer receivers etc. (please refer to "EnOcean_equipment_profiles_x.x.pdf" for detail information).

On the same way LPC-2.EO1 can communicate and transfer the data between each other and thus establish wireless connection between the LPC-2 controllers.

EnOcean *WinEtel* telegram sender/receiver/analyzer program is used to analyze EnOcean serial and radio communication traffic. *WinEtel* software is also used to determine the EnOcean devices, needed to set up LPC-2.EO1 module.

2 FEATURES

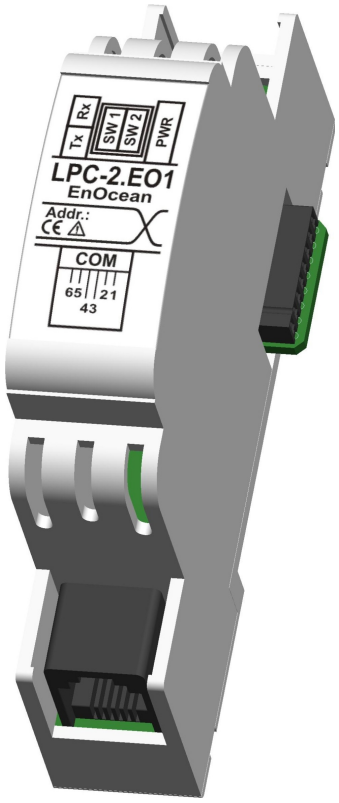


Figure 1: LPC-2.EO1 EnOcean module

Table 1: Technical data
EnOcean transceiver module based on EnOcean TCM320 module with integrated whip antenna
Up to 5 receiver and 5 transmitter EnOcean devices supported
868 MHz or 315 MHz EnOcean radio standard[1]
Typical working range inside buildings is up to 30m
Standard DIN EN50022-35 rail mounting

1 For different EnOcean radio standard frequencies, please check LPC-2.EO1 module part number (P/N).

3 INSTALLATION

3.1 Connection scheme example

Figure 2: Connection scheme example

DIP SWITCH TABLE		
SW1	SW2	MODE
OFF	OFF	EnOcean TCM320 Connection
OFF	ON	Not Used
ON	OFF	LPC-2.EO1 Module Connection
ON	ON	Normal Operation

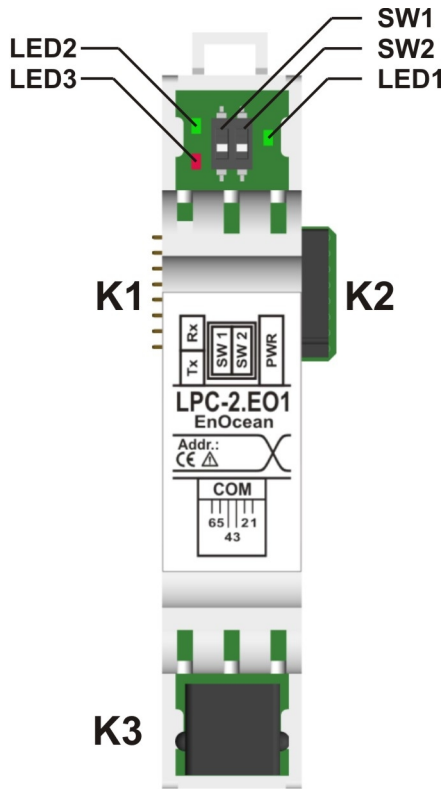


Table 2: K1		
Internal BUS	Data & DC power supply	Connection to I/O module

Table 3: K2		
Internal BUS	Data & DC power supply	Connection to I/O module

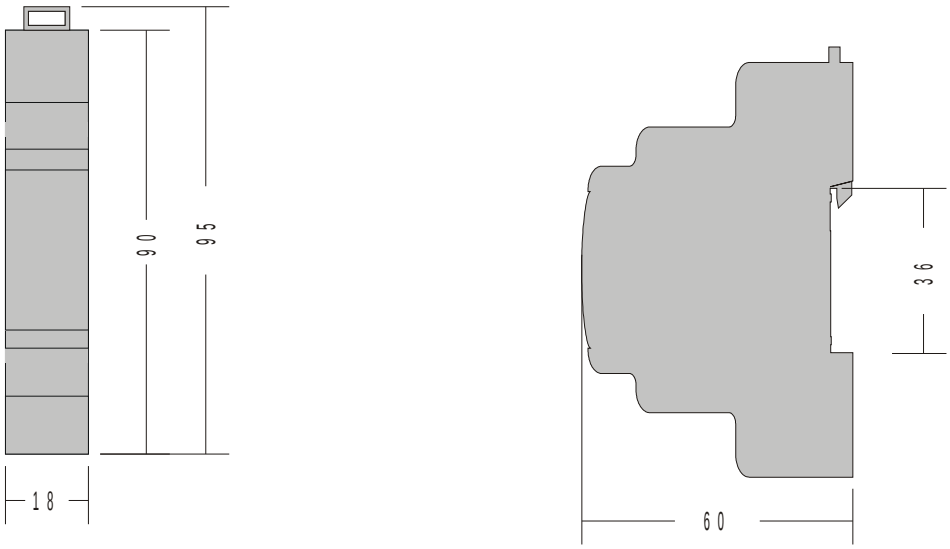
Table 4: K3		
COM.1	N.C.	Not connected
COM.2	GND	Ground
COM.3	N.C.	Not connected
COM.4	RS232: Tx •→	Data send output
COM.5	RS232: Rx •←	Data receive input
COM.6	N.C.	Not connected

Table 5: LEDs		
LED1	Green, LPC-2.EO1 status	Off: No power supply On: OK
LED2	Green, EnOcean Rx packet status	On: Receiving Rx packet
LED3	Red, EnOcean Tx packet status	On: Transmitting Tx packet

Table 6: DIP SWITCH		
SW1	LPC-2.EO1 mode selection	Refer to Figure 2, connection scheme DIP switch table
SW2	LPC-2.EO1 mode selection	Refer to Figure 2, connection scheme DIP switch table

3.2 Mounting instructions

Figure 3: Housing dimensions



- Dimensions in millimetres.

All connections, module attachments and assembling must be done while module is not connected to the main power supply. Any barrier between EnOcean devices and LPC-2.E01 module weakens the reception quality of wireless signal.

Mounting instructions:

1. Switch OFF main power supply.
2. Mount LPC-2.EO1 module to the provided place inside an electrical panel (DIN EN50022-35 rail mounting).
3. Mount other LPC-2 modules (if required). Mount each module to the DIN rail first, then attach modules together through K1 and K2 connectors.
4. Switch ON main power supply.
5. Green LED1 should turn on
6. To set-define the communication with EnOcean devices, the setup parameter procedure must be execute. See APPENDIX for description.

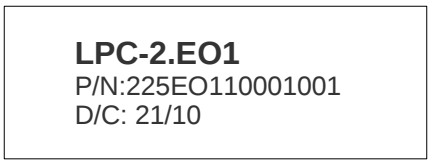
Dismount in reverse order. For mounting/dismounting modules to/from DIN rail a free space of at least one module must be left on the DIN rail.

NOTE: LPC-2 MCU main control module should be powered separately from other electrical appliance connected to LPC-2 system. Signal wires must be installed separately from power and high voltage wires in accordance with general industry electrical installation standard.

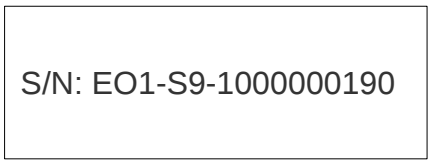
3.3 Module labeling

Figure 4: Labels on housing

Label 1(LPC-2.EO1 module sample):



Label 2(LPC-2.EO1 module sample):



Label 1 description:

1. **LPC-2.EO1** is the full product name.
2. **P/N:225EO110001001** is the part number.
   - **225** – general code for LPC-2 product family,
   - **EO1** – short product name,
   - **10001** – sequence code,
     - 10 – year of code opening
     - 001 – derivation code
   - **001** – version code (reserved for future HW and/or SW firmware upgrades).
3. **D/C:21/10** is the date code.
   - **21** – week and
   - **10** – year of production.

Label 2 description:

1. **S/N:EO1-S9-1000000190** is the serial number.
   - **EO1** – short product name,
   - **S9** – user code (test procedure, e.g. Smarteh person xxx),
   - **1000000190** – year and current stack code,
     - 10 – year (last two cyphers)
     - 00000190 – current stack number; previous module would have the stack number 00000189 and the next one 00000191.

4 TECHNICAL SPECIFICATIONS

Table 5: Technical specifications	
Power supply	from internal BUS
Number of EnOcean devices supported	5 EnOcean receivers and 5 EnOcean transmitters
EnOcean radio standard	868 MHz or 315 MHz
Max. power consumption	0,5 W
Dimensions (L x W x H)	90 x 18 x 60 mm
Weight	50 g
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Maximum altitude	2000 m
Mounting position	vertical
Transport and storage temperature	-20 to 60 °C
Pollution degree	2
Protection class	IP 30

5 APPENDIX: SETUP PARAMETER PROCEDURE

To define EnOcean devices with which LPC-2.EO1 module will communicate (send or receive data), next procedure must be executed. For any additional information, please contact Smarteh technical support.

The procedure consists of following steps:
- selection of the LPC-2 HW configuration with LPC-2.EO1 module using LPC Composer SW tool
- EnOcean devices determination mode, using EnOcean WinEtel SW communication tool

- setting up devices definition data into LPC-2.EO1 module using LPC Tester SW tool
- writing application program on LPC-2 main control unit using LPC Manager SW tool

Selection of LPC-2 HW configuration

LPC-2.EO1 is one of the I/O modules, that is mounted on the right side of LPC-2 main control unit. The HW configuration must be done with *LPC Composer*. For application programming, *LPC Manager* SW is used. (for details please refer to LPC Composer and LPC Manager User Manual)

EnOcean devices determination mode with LPC-2.EO1 module

Start the WinEtel (*WinEtel.exe*) on the PC. *(It can be downloaded from EnOcean website).*

WinEtel is a telegram sender/receiver/analyzer program used to analyze EnOcean serial and radio communication.

LPC-2.EO1 module must be connected to the LPC-2 configuration and powered.

Set the DIP Switch on LPC-2.EO1 module to <SW1=Off, SW2=Off>
(*EnOcean TCM320 Connection mode*).

Connect the PMC (see Smarteh products) serial cable between RS232 PC port and RJ connector on LPC-2.EO1.

In EnOcean WinEtel SW select the correct serial port and press »Connect« button.

After successful connection, all receive and transmit EnOcean devices data will be logged. *Please read WinEtel help topics for detailed instructions about working with program.*

When EnOcean device changes its state, value etc., the relevant data is sent to the EnOcean wireless network.

Setting up devices definition data into LPC-2.EO1 module

All needed data that is used for setting EnOcean device definition in LPC-2.EO1 module is listed in WinEtel log window. Detailed description of the data are described in EnOcean User Manual (example: User Manual TCM3xy Vx.xx.pdf).

For device definition in LPC-2.EO1 module, following data and parameters are used.
For input devices:
ID (hex) example: 0x16121
ORG (hex) example: 0x6

The data (ORG, ID), must be defined on target LPC-2.EO1 EnOcean receiving device, individually for each receiving channel In1_ID_Byte0 .. In5_ID_Byte3 and Out1_ORG .. Out5_ORG, as confirmed device from which it is receiving data from.

For output devices:
ORG (hex) example: 0x30

The data (ORG), must be defined on corresponding LPC-2.EO1 EnOcean transmitting device, individually for each transmitting channel Out1_ORG .. Out5_ORG.

To define target EnOcean device for receiving data from LPC-2.EO1 module with its unique ID, use *learn* mode procedure as described in relevant receiving EnOcean device user manual.

To set or write this device definition parameters into LPC-2.EO1, following steps must be done: - press »disconnect« button in WinEtel window
- set the DIP Switch on LPC-2.EO1 module to <SW1=On, SW2=Off> (*LPC-2.EO1 Module Connection mode*).
- start the LPC Tester. Load *xml* buffer (CTRL&Shift+F11) and select *LPC2_EO1.xml* file with parameter descriptions
- press »Start« button to establish on line communication with LPC-2.EO1 module

In Buffer selector drop-list select the relevant EEPROMs for devices parameters (mask) definition.

EEPROM1 .. EEPROM5 for setting the parameters (mask) of 1 to 5 devices that LPC-2.EO1 module will transmit data blocks to.

Example setting for output Data block 1 parameters in LPC Tester EEPROM1.

Table 6: EEPROM 1	Output Data block 1
Out1_ORG	

Example of converting of the output Data block 1 parameters in LPC Tester EEPROM1.

Source Out1_ORG - Winlog	0x30
Hexadecimal	30
Decimal	48

Write down the parameters in command boxes and press Download button to set the parameters into corresponding EEPROM.

EEPROM6 .. EEPROM10 for setting the parameters (mask) of 1 to 5 devices that LPC-2.EO1 module will receive data blocks from.

Example setting for input Data block 1 parameters in LPC Tester EEPROM6.

Table 7: EEPROM 6	Input Data block 1
In1_ID_Byte3	0
In1_ID_Byte2	1
In1_ID_Byte1	97
In1_ID_Byte0	33
In1_ORG	6

The source ID data must be converted into decimal, split values and write under 4 command fields.

Example of converting of the input Data block 1 parameters in LPC Tester EEPROM6.

Source In1_ID_Byte0 - Winlog	0x 16121			
Hexadecimal	00	01	61	21
Decimal	0	1	97	33

Source In1_ORG - Winlog	0x6
Hexadecimal	06
Decimal	6

Write down the parameters in command boxes and press Download button to set the parameters into corresponding EEPROM.

Data of devices are transferred between LPC-2.EO1 module and main control unit on corresponding addresses downloaded into EEPROMs. In LPC Tester Buffer selector drop-list RAM1 can be selected, to read and write corresponding data of defined EnOcean devices (Data blocks).

In devices Data blocks variables, there are 4 bytes (2 words) for each device, that are received or transmitted over EnOcean wireless network. 4 received or transmitted bytes are represented by 2 words as following.

Received Data blocks variables allocation:

Block 1 In High (word)	Data block 1, byte 3	High byte of Block 1 In High word
	Data block 1, byte 2	Low byte of Block 1 In High word
Block 1 In Low (word)	Data block 1, byte 1	High byte of Block 1 In Low word
	Data block 1, byte 0	Low byte of Block 1 In Low word

Transmitted Data blocks variables allocation:

Block 1 Out High (word)	Data block 1, byte 3	High byte of Block 1 Out High word
	Data block 1, byte 2	Low byte of Block 1 Out High word
Block 1 Out Low (word)	Data block 1, byte 1	High byte of Block 1 Out Low word
	Data block 1, byte 0	Low byte of Block 1 Out Low word

Meaning of the values corresponds to each device specifications. Please check the manufacturers device specification user manual for details.

Example of EnOcean switch device:

Block 1 In High	0x 0	0x 0	0x 0
Block 1 In Low	0x 0	0x 9	0x 8
Meaning (status)	N/A	Switch On	Switch Off

Example of EnOcean actuator device:

Block 1 Out High	0x 0	0x 0	0x 0
Block 1 Out Low	0x 0	0x 9	0x 8
Meaning (status)	N/A	Contact On	Contact Off

Working mode with LPC-2 controller

After the setting parameters were stored into EEPROMs, the module is ready to run. LPC-2.EO1 and/or other EnOcean devices are linked up on input device Inx_ID_Byte0 .. Inx_ID_Byte3, Inx_ORG and output Outx_ORG data.

Set the DIP Switch on LPC-2.EO1 module to <SW1=On, SW2=On>.(*Normal Operation mode*)

Disconnect the PMC serial cable.

Data of devices is transferred between LPC-2.EO1 module and main control unit.

In devices Data block variables there are 4 bytes for each device, that are received or transmitted over EnOcean wireless network. Meaning of the values corresponds to each device specifications. Please check the manufacturers device specification user manual for details.

Example of EnOcean switch device:

EO1_1_iData1_3	0x 0	0x 0	0x 0
EO1_1_iData1_2	0x 0	0x 0	0x 0
EO1_1_iData1_1	0x 0	0x 0	0x 0
EO1_1_iData1_0	0x 0	0x 9	0x 8
Meaning (status)	N/A	Switch On	Switch Off

Example of EnOcean actuator device:

EO1_1_oData1_3	0x 0	0x 0	0x 0
EO1_1_oData1_2	0x 0	0x 0	0x 0
EO1_1_oData1_1	0x 0	0x 0	0x 0
EO1_1_oData1_0	0x 0	0x 9	0x 8
Meaning (command)	N/A	Contact On	Contact Off

CHANGES

The following table describes all the changes to the document.

Date	V.	Description
1.7.2012	003	CGP General update.
28.10.2011	002	Updated chapter “Setup PARAMETER PROCEDURE"
25.5.2010	001	The initial version, issued as *LPC-2.EO1 EnOcean module UserManual*.

NOTES